*Figure 1a*

*Figure 1b*

*Figure 2*

**FIGURE 3**

**FIGURE 4A**

NRZ DATA = '1'

405

400 401 402

409 406

403

404

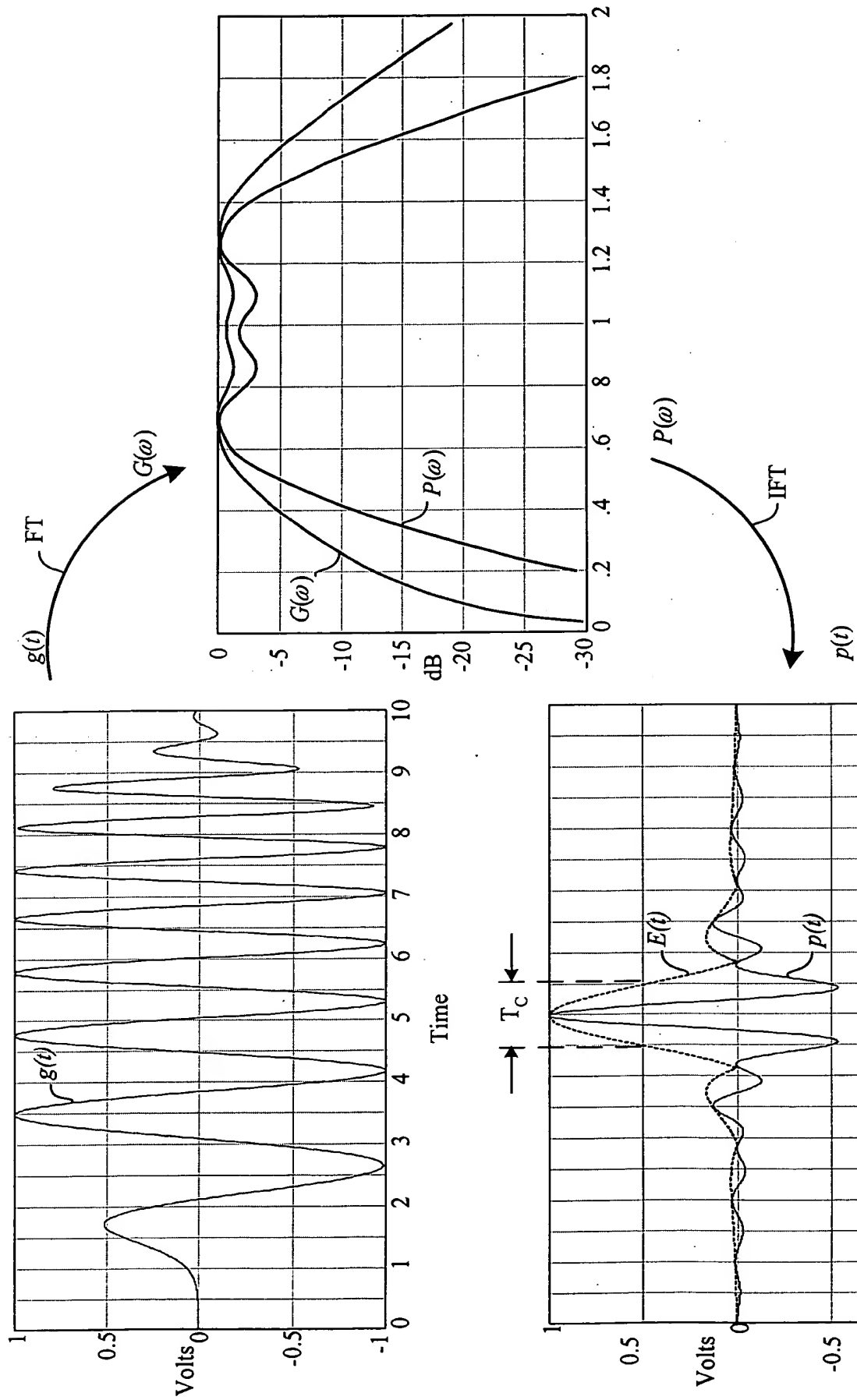**FIGURE 4B**

NRZ DATA = '0'

406

400 401 402

407 408

403

404
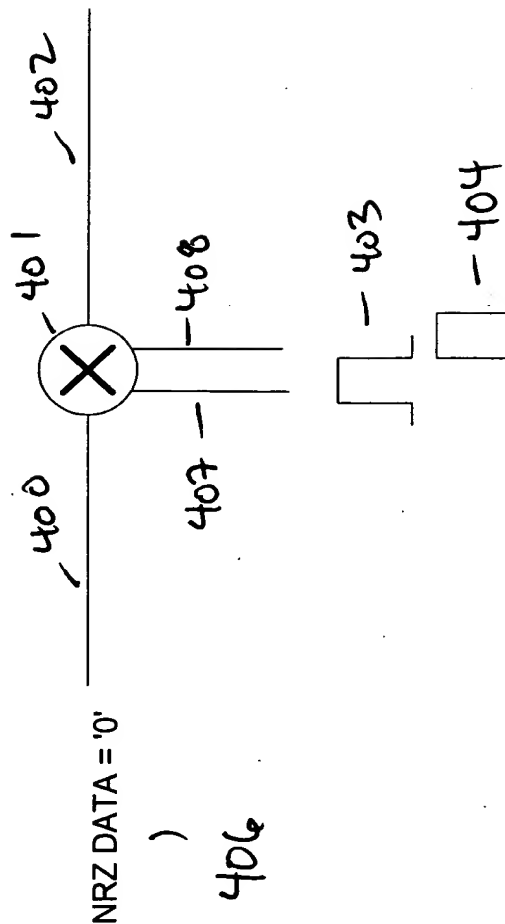
FIGURE 5A
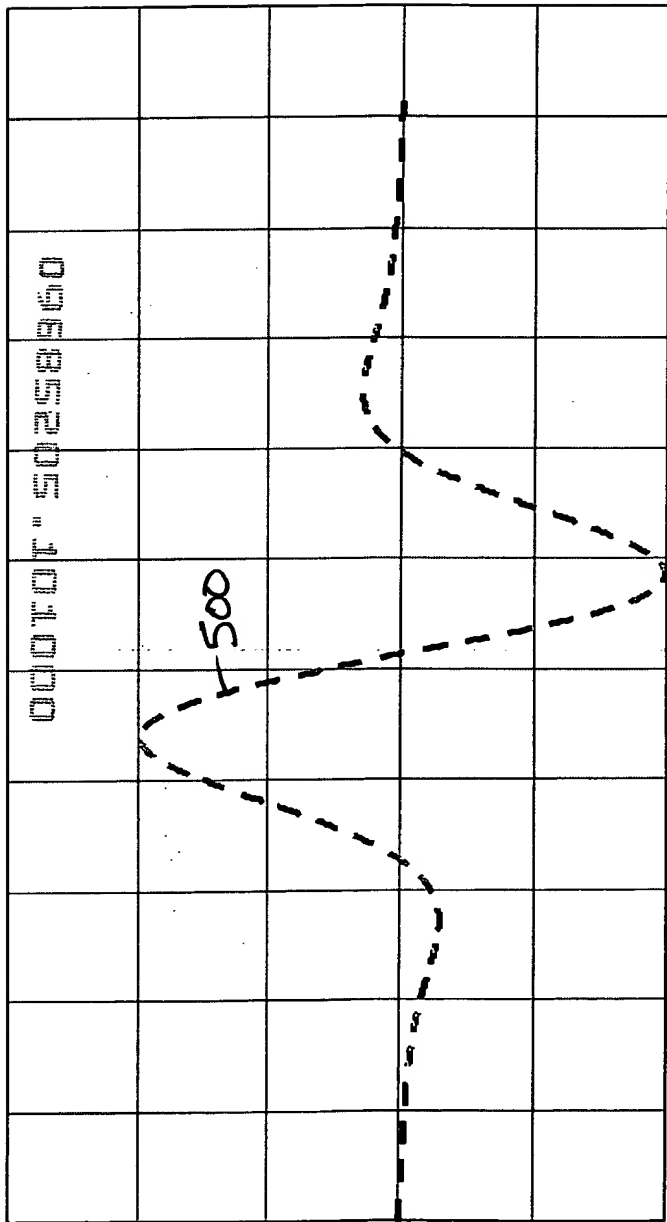
FIGURE 5B

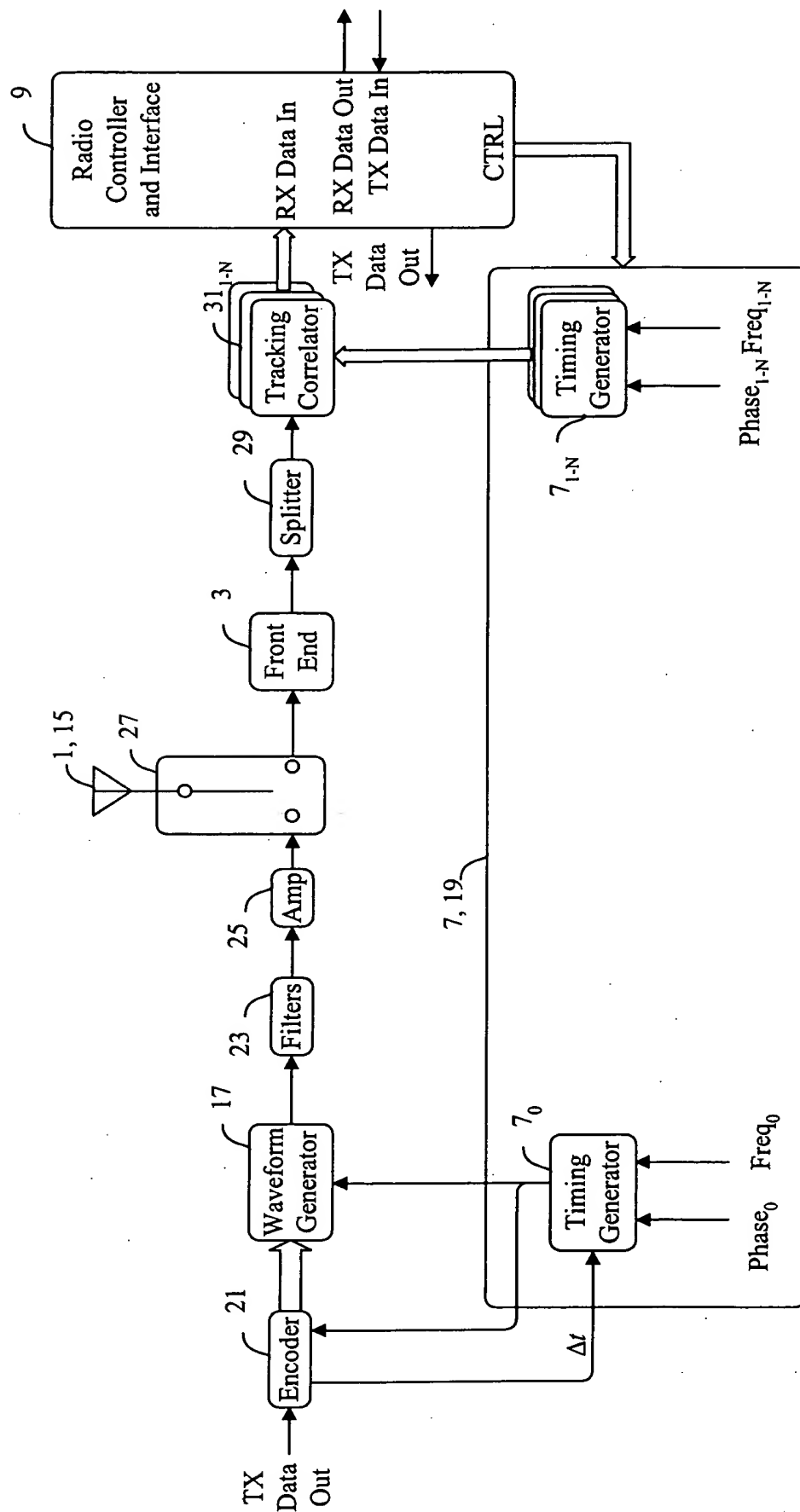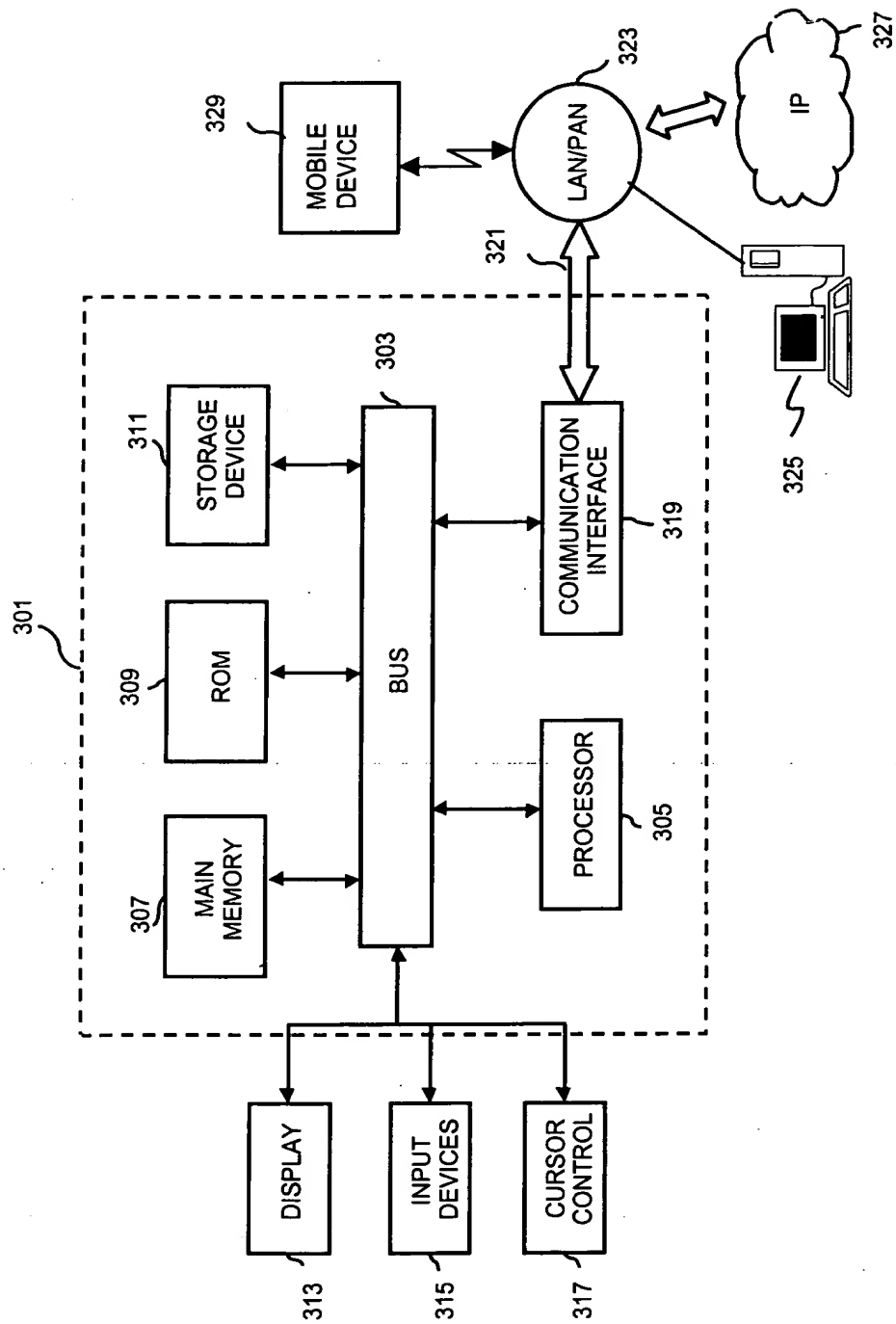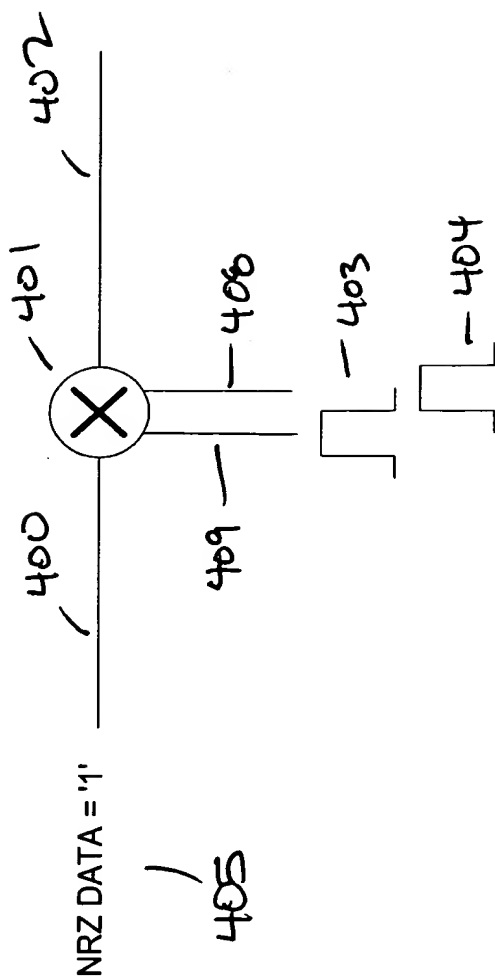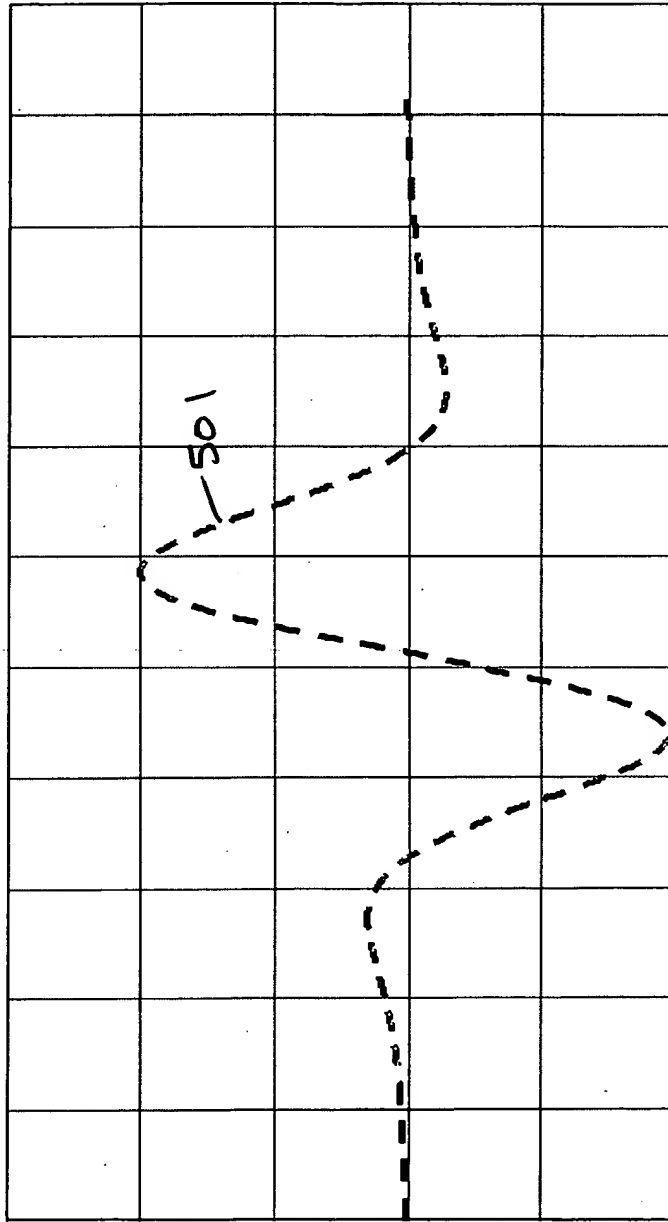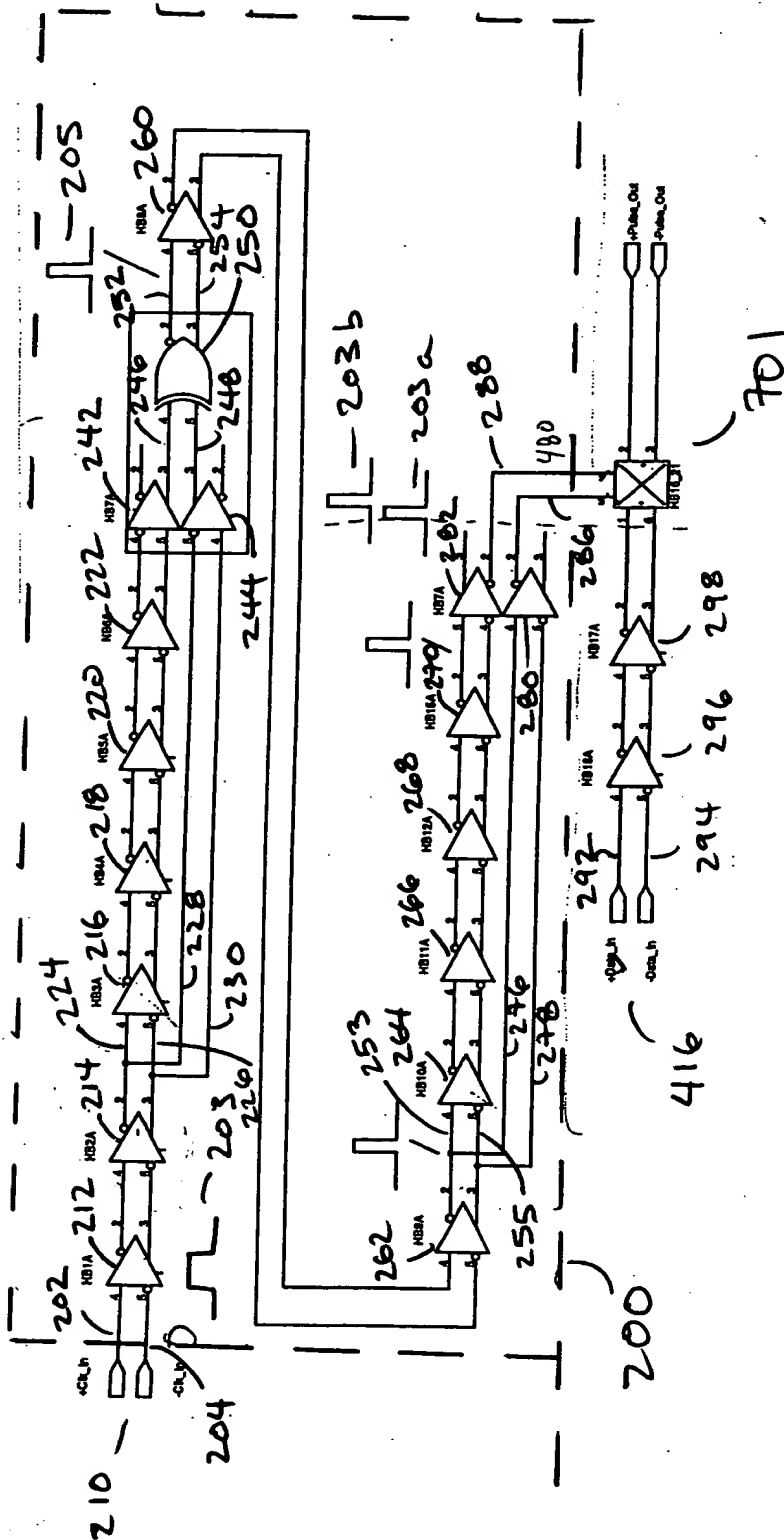FIGURE 6

FIGURE 6A
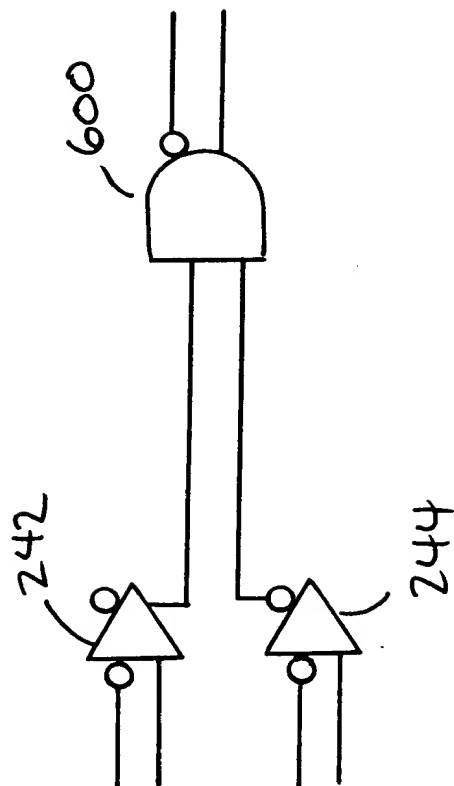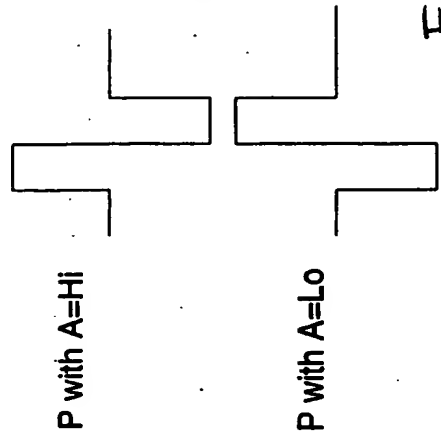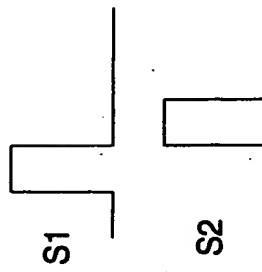
FIGURE 7A

FIGURE 7B

FIGURE 7C

FIGURE 7D

FIGURE 7E

FIGURE 7F

S1

S2

P with A=Hi

P with A=Lo

## FIGURE 8A

NRZ DATA = '1'
405

400
401
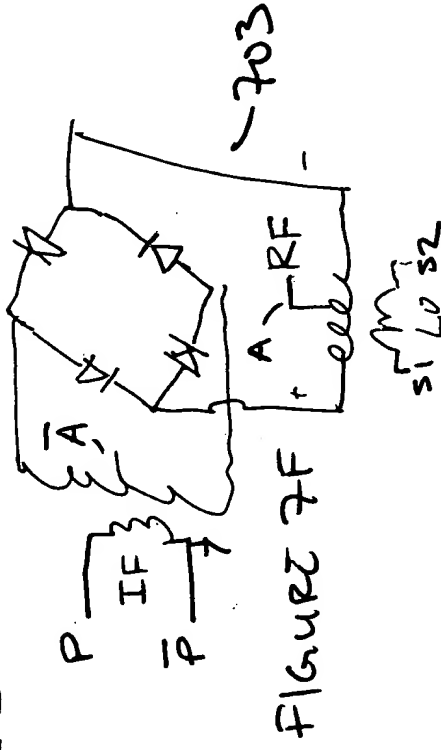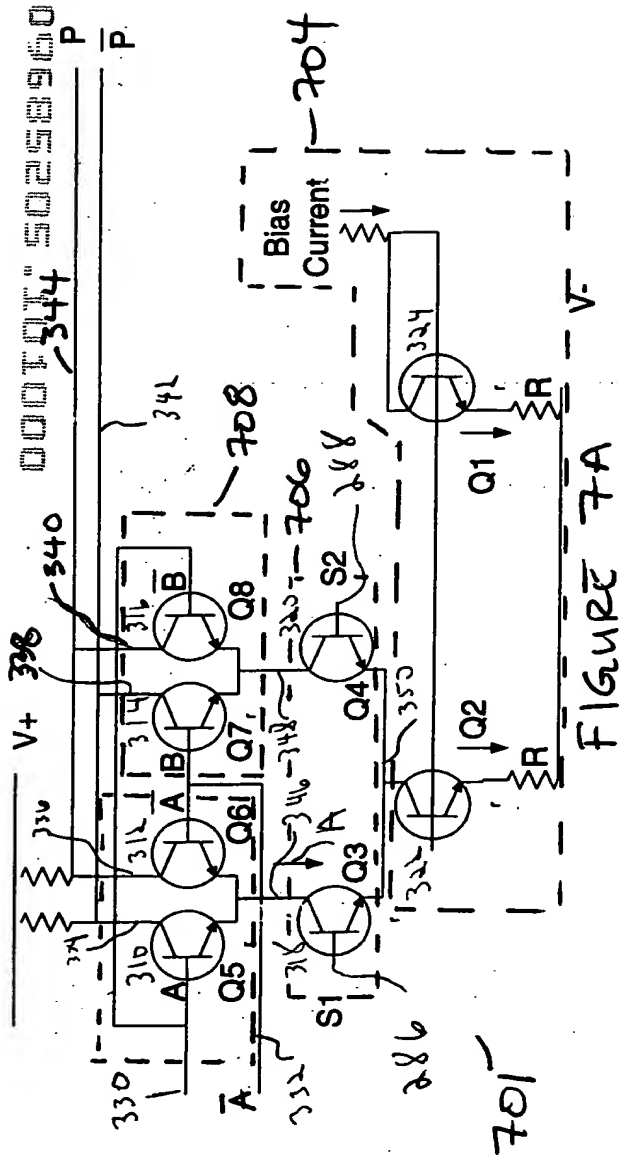402

407
408

409

410

## FIGURE 8B

NRZ DATA = '0'
406

400
401
402

407
408

409

410

FIGURE 9A

FIGURE 9B

**FIGURE 10**

# FIGURE 10A



UWB WAVELETS

Σ    1005

1003

1006

1004

1007

1010   D/A
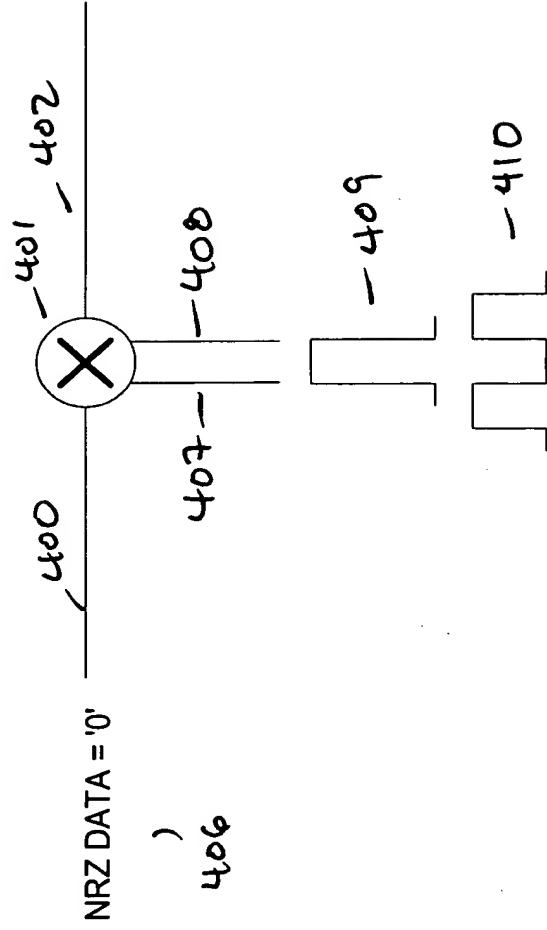
1012   D/A

1014   LOOKUP TABLE

NRZ DATA
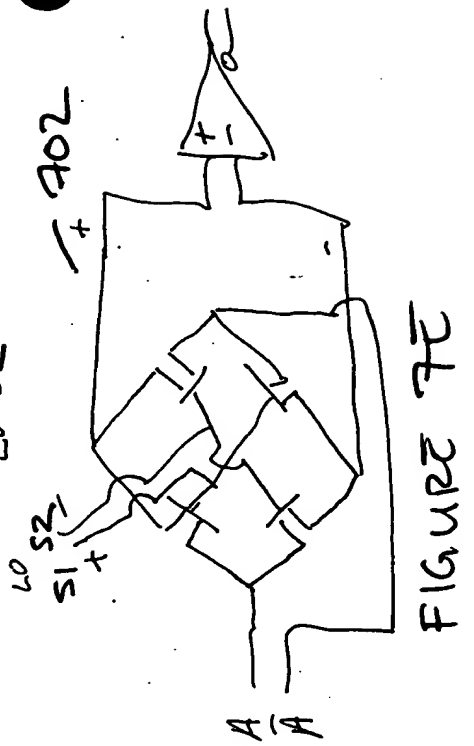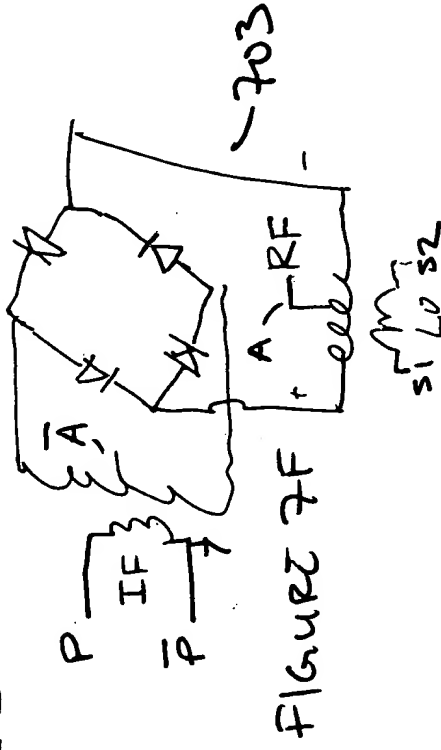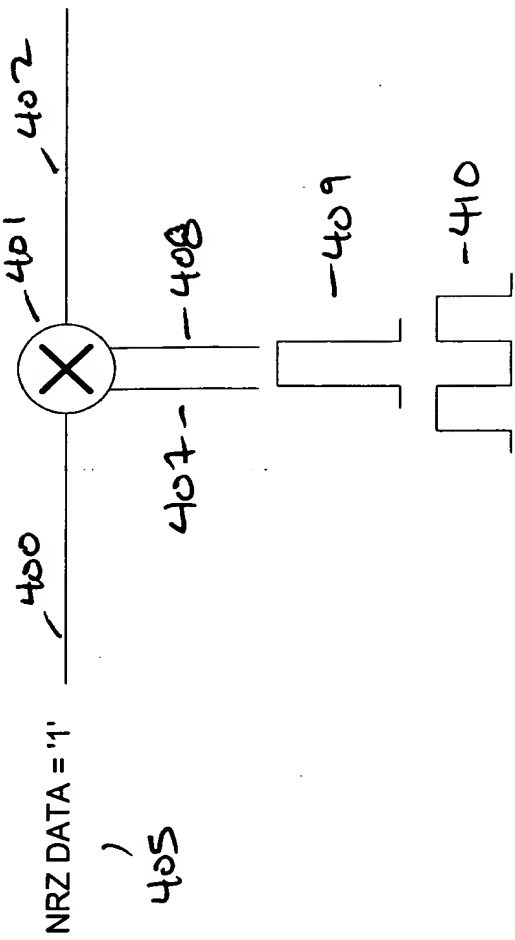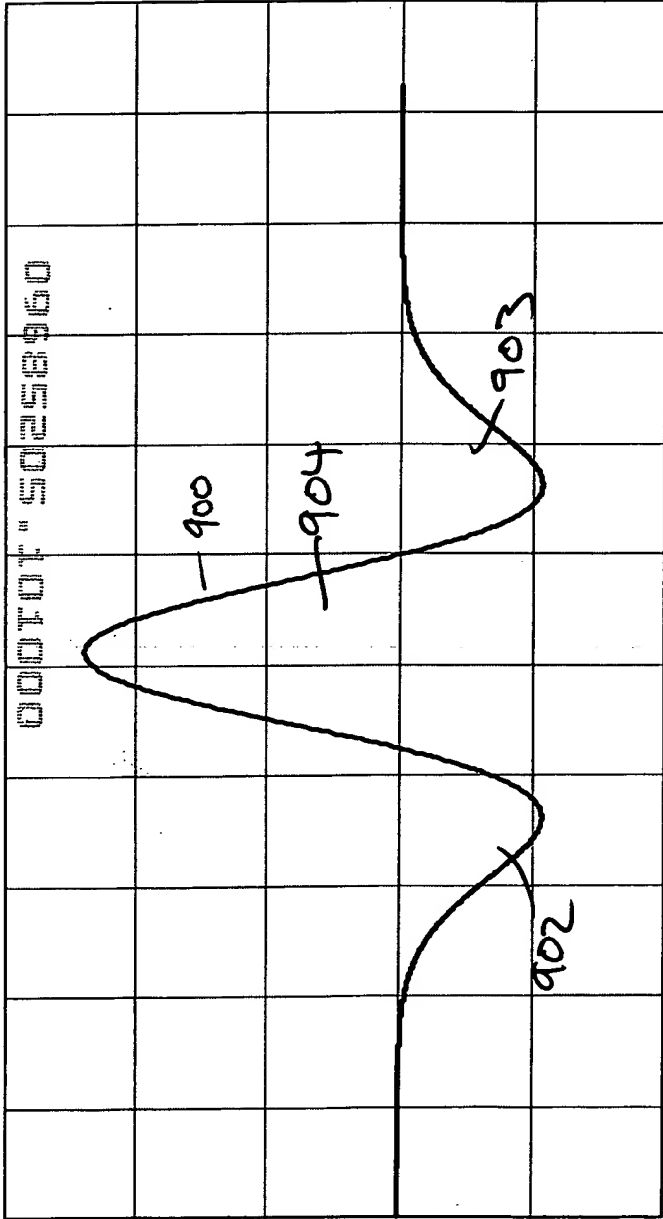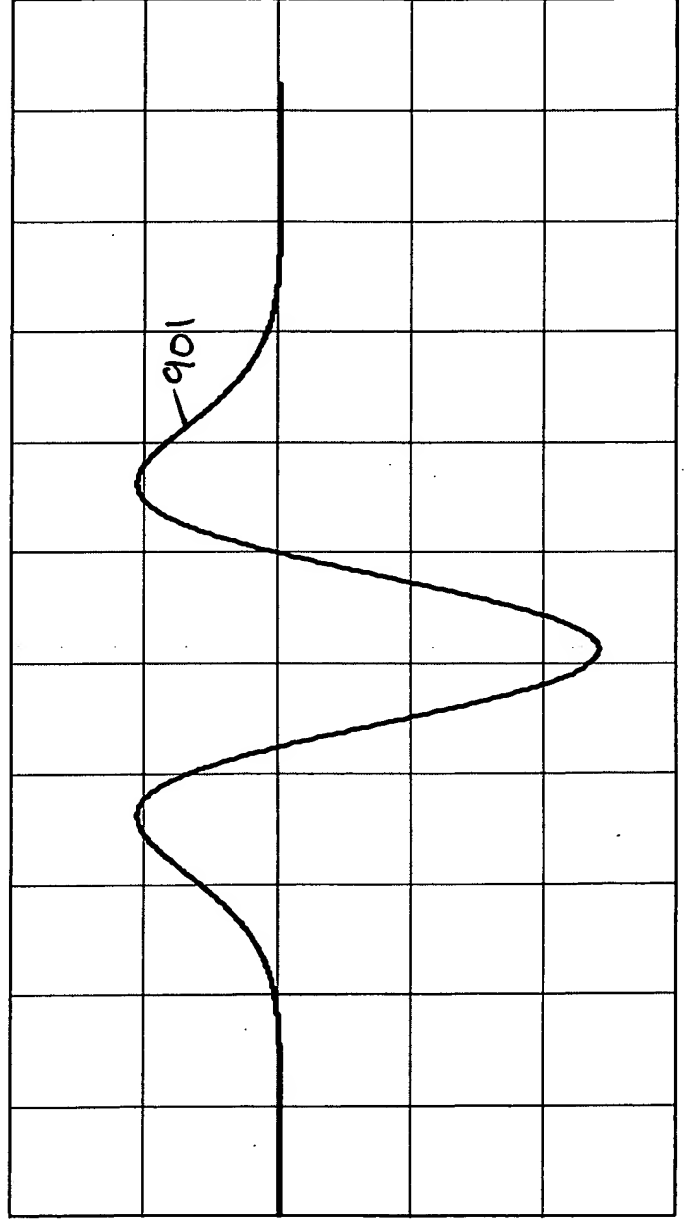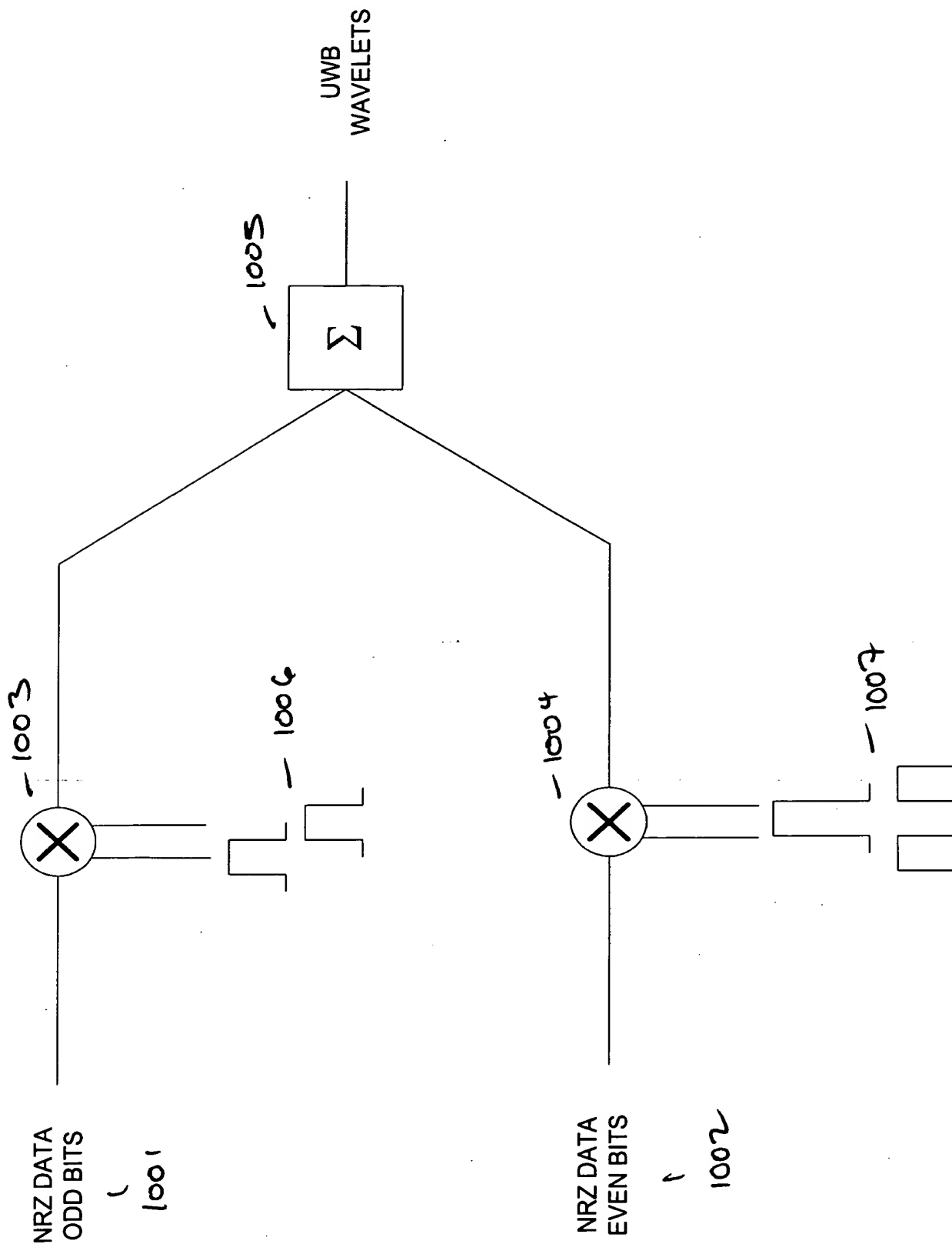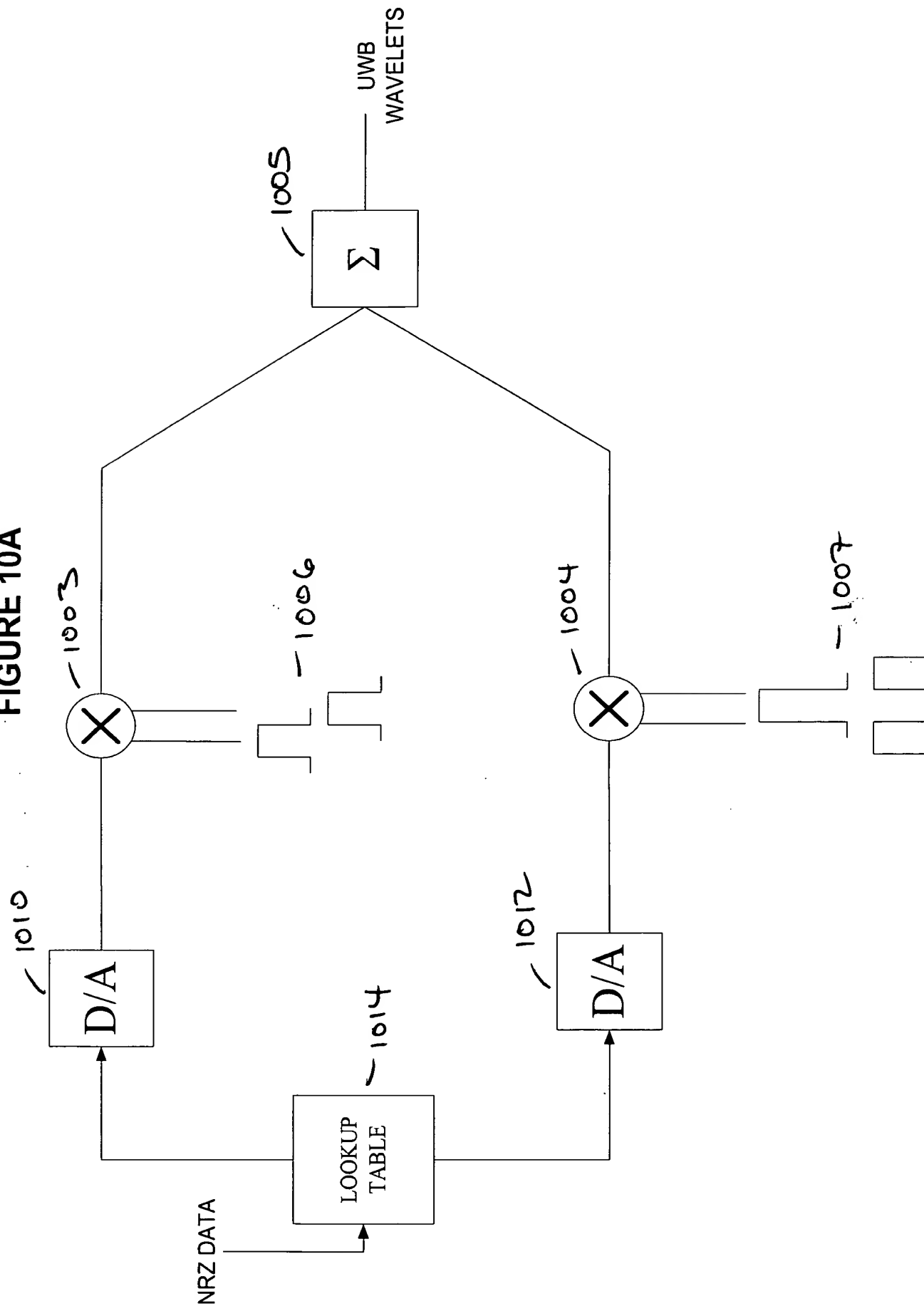
**FIGURE 11**
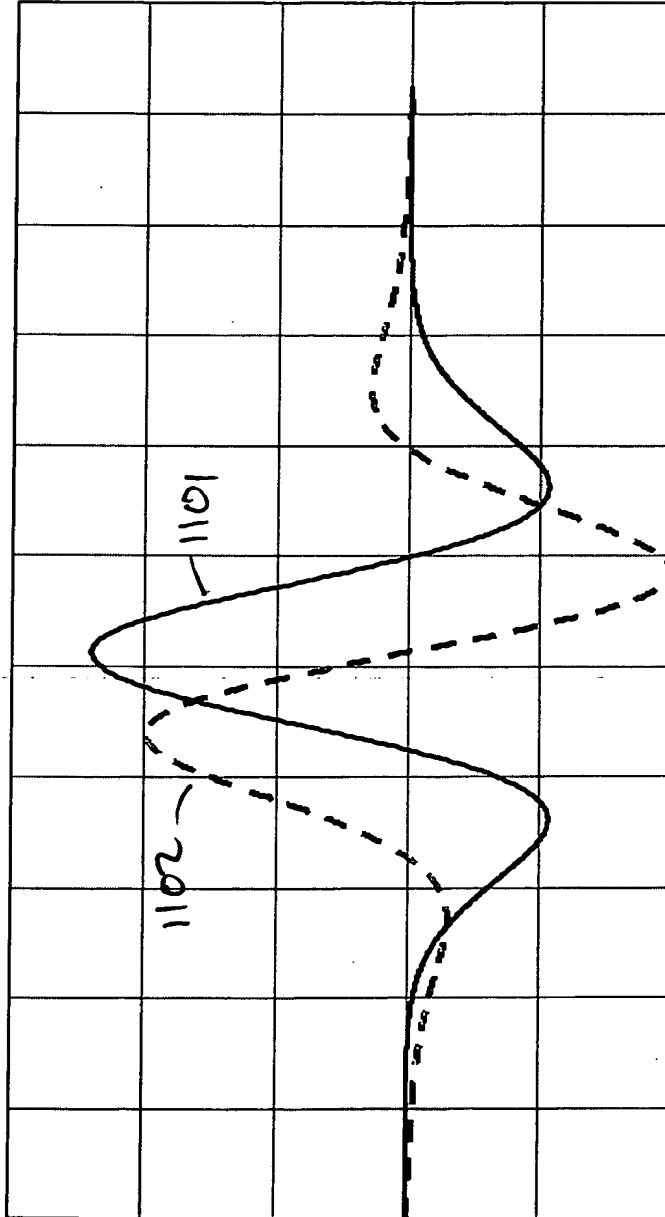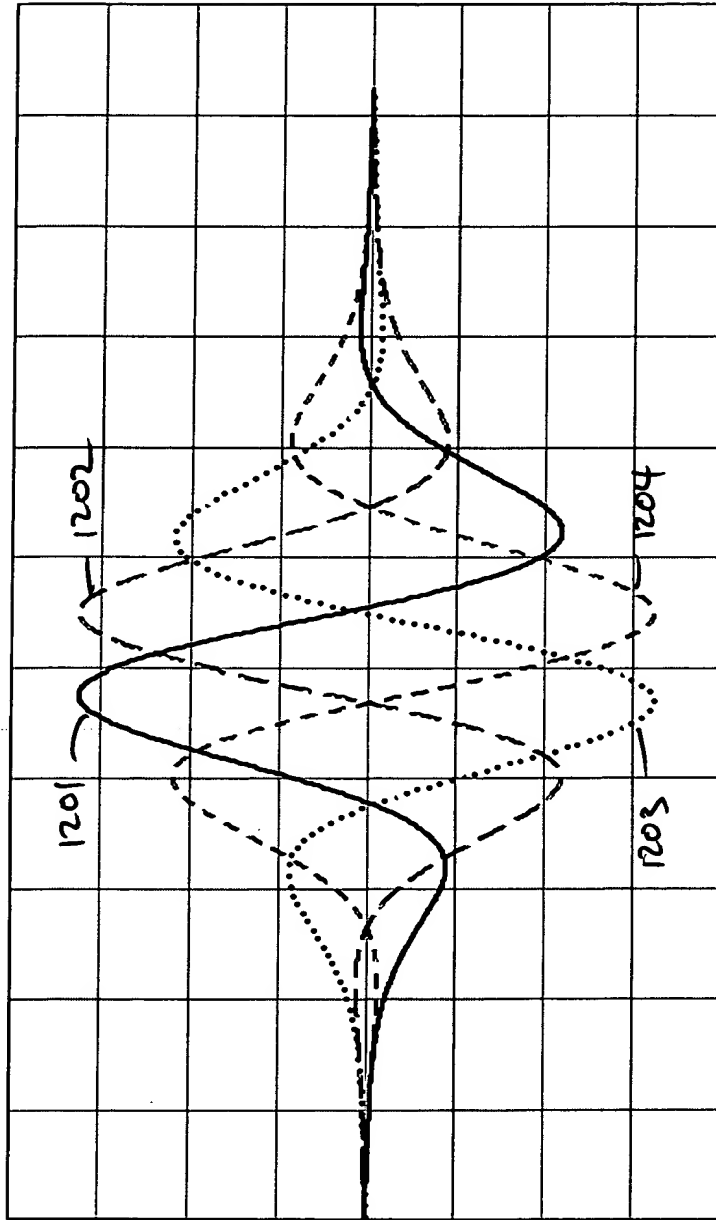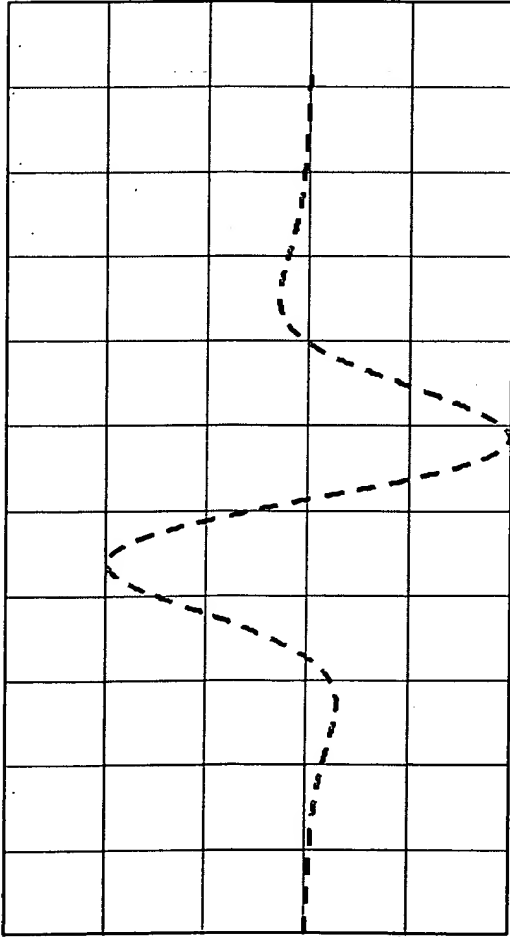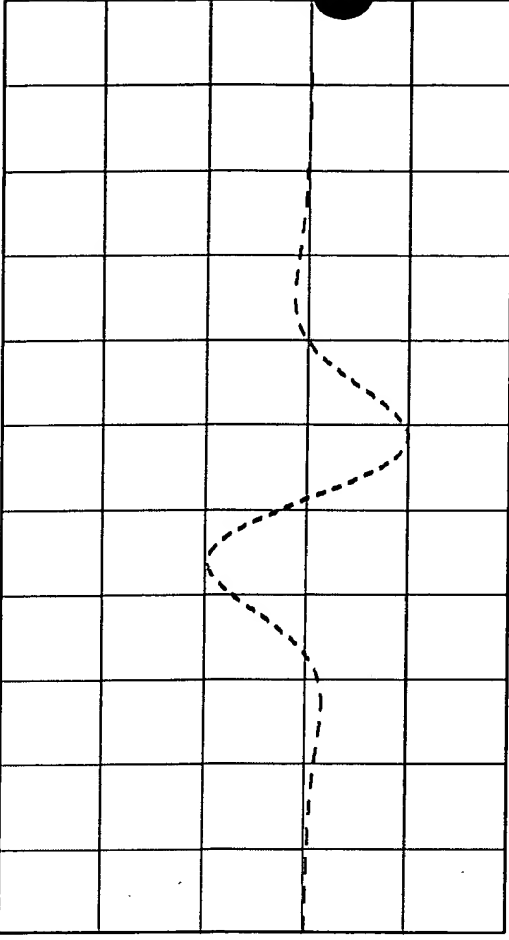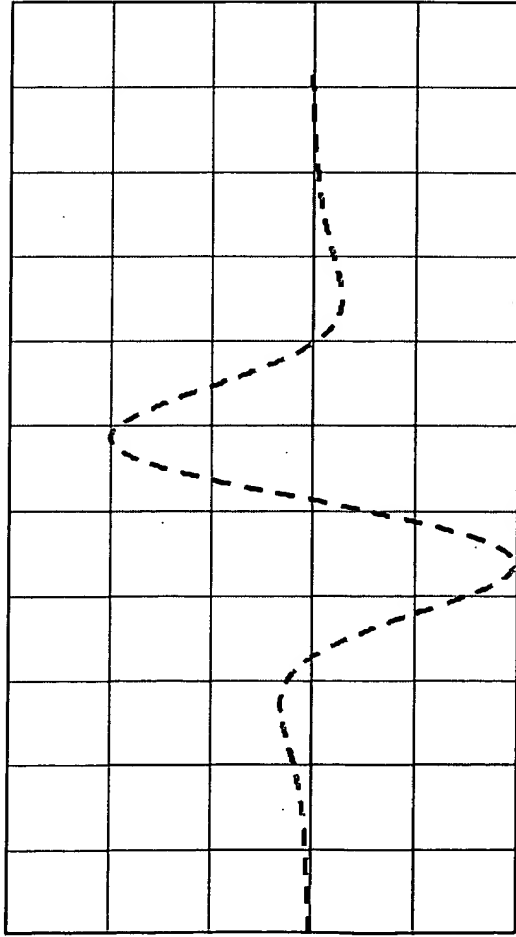
FIGURE 12

FIGURE 13B

FIGURE 13D

FIGURE 13A
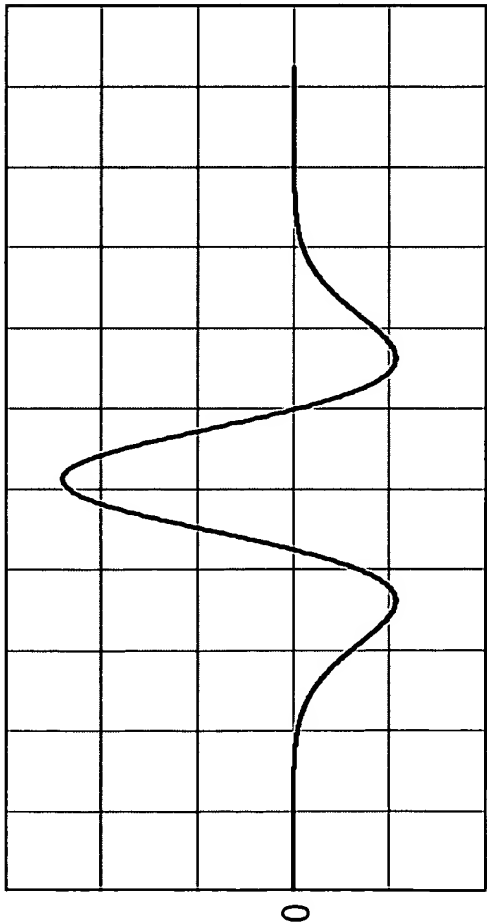
FIGURE 13C

**FIGURE 14B**

**FIGURE 14A**
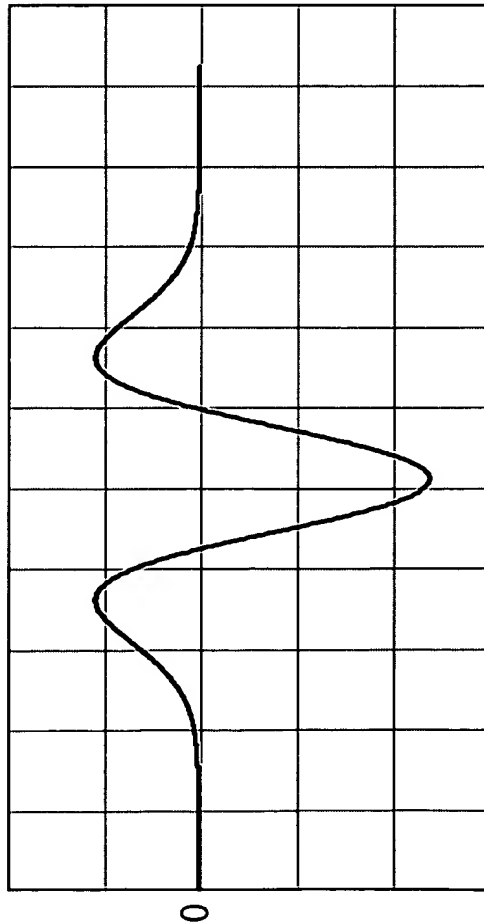
**FIGURE 14D**

**FIGURE 14C**
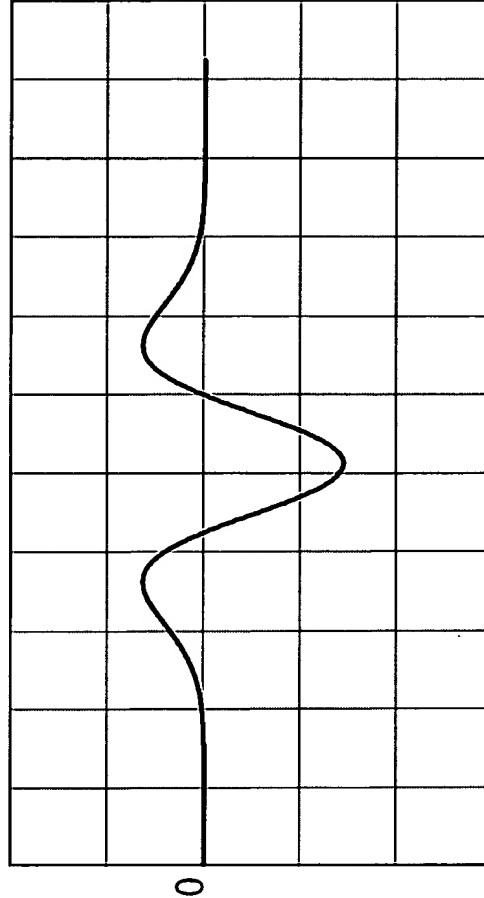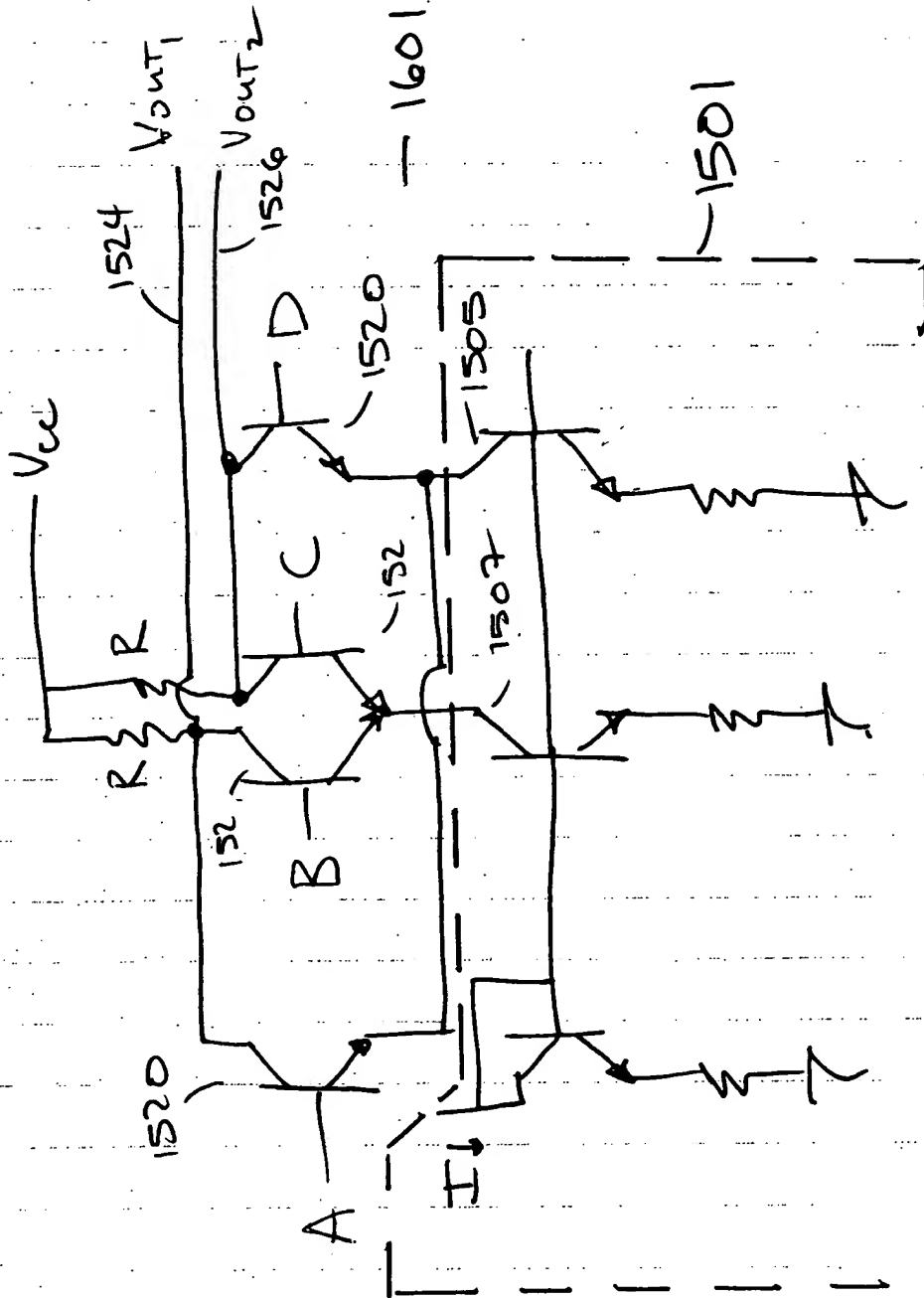
FIGURE 15

| Bit | A | B | C | D | Vout₁−Vout₂ |
|-----|---|---|---|---|-------------|
| 11 | 0 | 0 | 1 | 1 | 2IR |
| 00 | 1 | 1 | 0 | 0 | −2IR |
| 10 | 0 | 0 | 1 | 0 | IR |
| 01 | 1 | 0 | 0 | 0 | −IR |

**FIGURE 16**

NRZ DATA

ENCODER — 1603

NRZ DATA (ODD BIT)

AMPLITUDE (EVEN BIT)

D/A — 1601

1602

UWB WAVELETS

## FIGURE 17



UWB WAVELETS

1706

1601

D/A

NRZ DATA (BITS 3n, n=0,1,....)

NRZ DATA (BITS 3n+1, n=0,1,....)

1705

SWITCH

1710

1706

NRZ DATA (BITS 3n+2, n=0,1,....)

1712

LOOK UP TABLE

NRZ DATA

**FIGURE 18**

N-BIT USER CODE

÷N

CLK

NRZ DATA

2001

2002

FIGURE 19